

## Appendix C7

### ESEM/EDS Data for Test #5, Day-30 Birdcage Fiberglass

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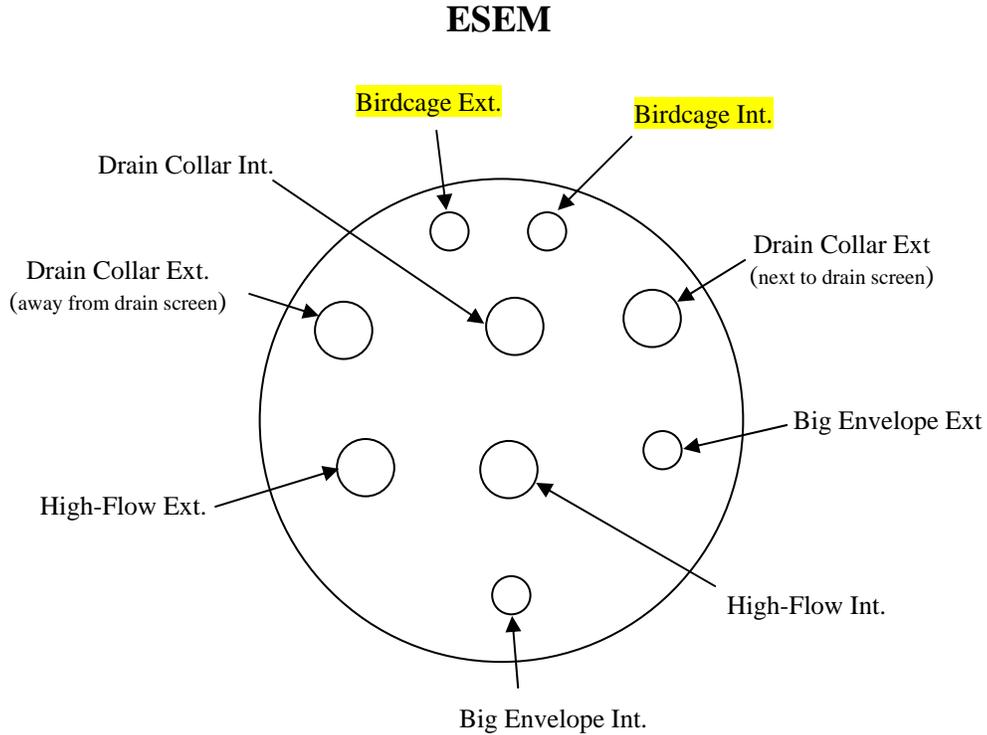
This appendix lists the ESEM/EDS results for the fiberglass samples within the birdcage submerged in the testing solution. The purpose of this analysis was to determine the degree and the extent to which particulate debris migrates and attaches to fiberglass. In this appendix, the fiberglass samples within the birdcage were extracted on the date Test #5 was shut down (August 25, 2005). Both exterior and interior fiberglass samples were examined. ESEM was used to analyze the hydrated fiberglass samples without any coating under a low-vacuum condition (i.e., 80 Pa). ESEM/EDS results of the Test #5, Day-30 birdcage fiberglass samples were obtained on August 26, 2005.

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## Transcribed Laboratory Log

Laboratory session from August 26, 2005.

Test #5, Day-30 Birdcage Fiberglass



### Birdcage Exterior

Image:	T5BCX01	100 ×	ESEM image	Figure C7-1
	t5bcx02	100 ×	ESEM image	Figure C7-2
	t5bcx03	500 ×	ESEM image higher magnification	Figure C7-3
EDS:	t5bcx04		EDS on particles on t5bcx03	Figure C7-4
Image:	t5bcx05	500 ×	ESEM image	Figure C7-5

## **Birdcage Interior**

Image: t5bcI01	100 ×	ESEM image of fiberglass	Figure C7-6
t5bcI03	100 ×	ESEM image	Figure C7-7
t5bcI02	500 ×	ESEM image higher magnification	Figure C7-8

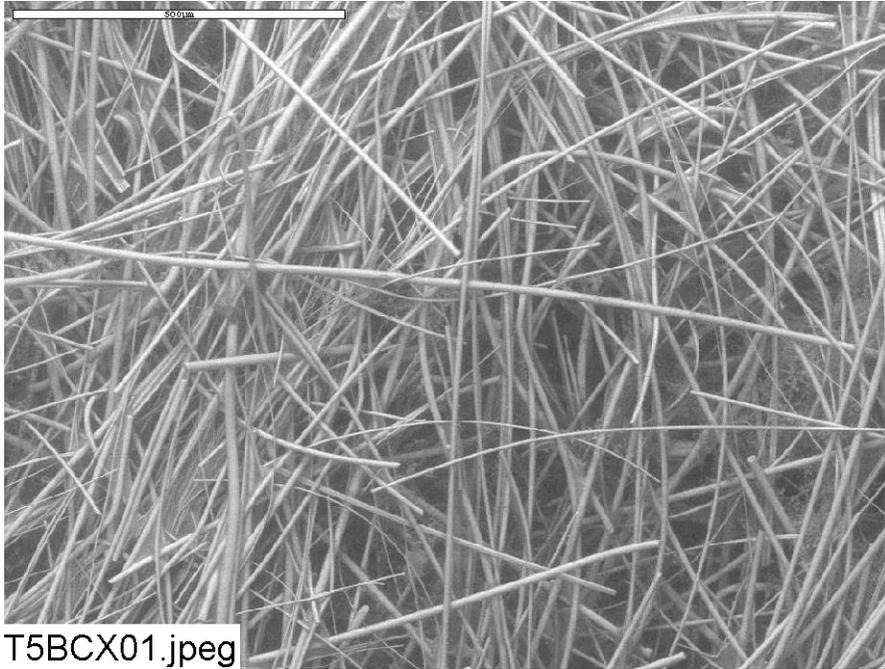


Figure C7-1. ESEM image magnified 100 times for a Test #5, Day-30 exterior fiberglass sample within the birdcage. (T5BCX01.jpeg)

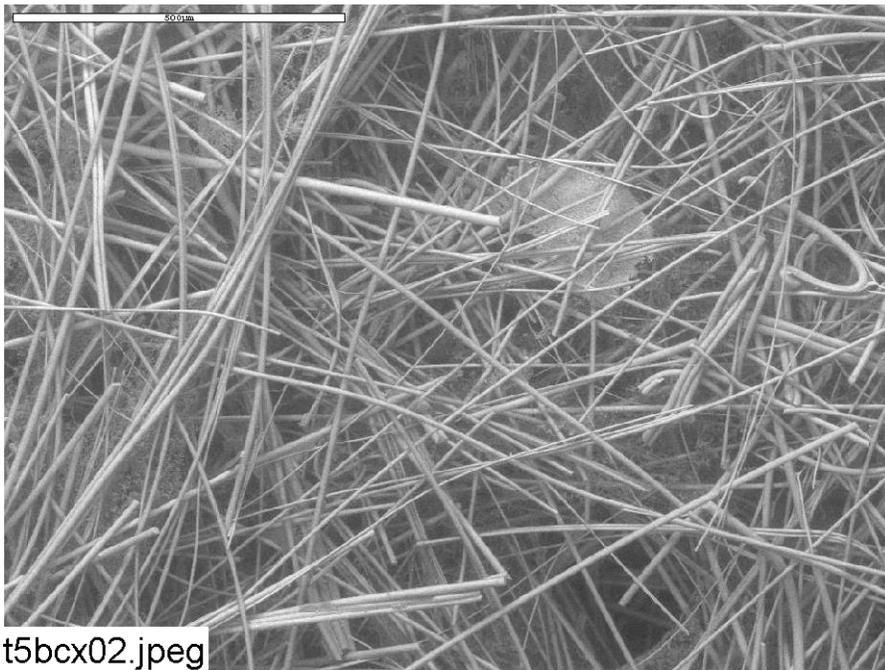


Figure C7-2. ESEM image magnified 100 times for a Test #5, Day-30 exterior fiberglass sample within the birdcage. (t5bcx02.jpeg)

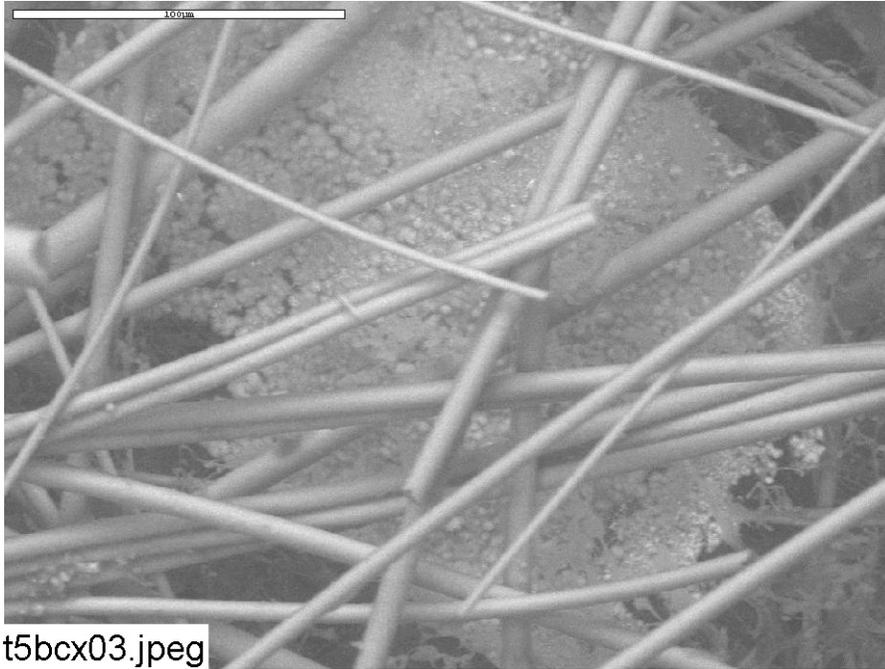


Figure C7-3. ESEM image magnified 500 times for a Test #5, Day-30 exterior fiberglass sample within the birdcage. (t5bcx03.jpeg)

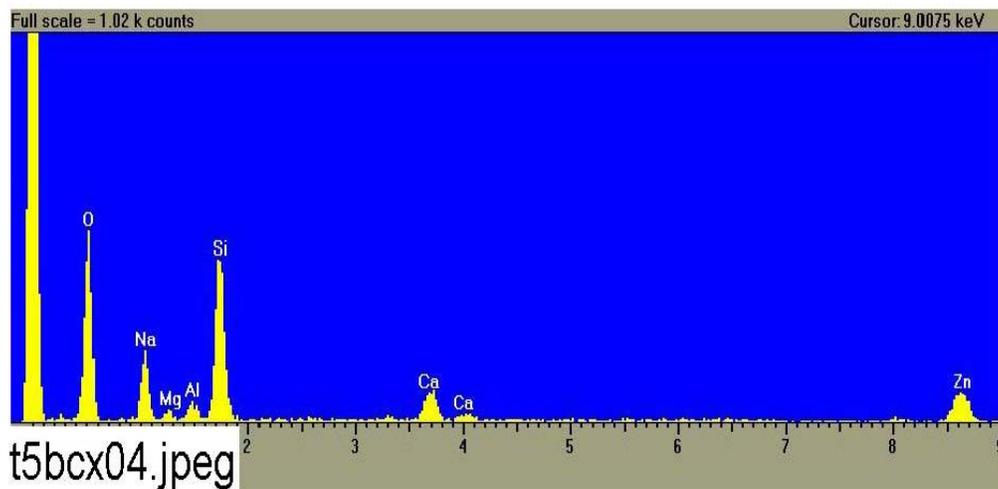
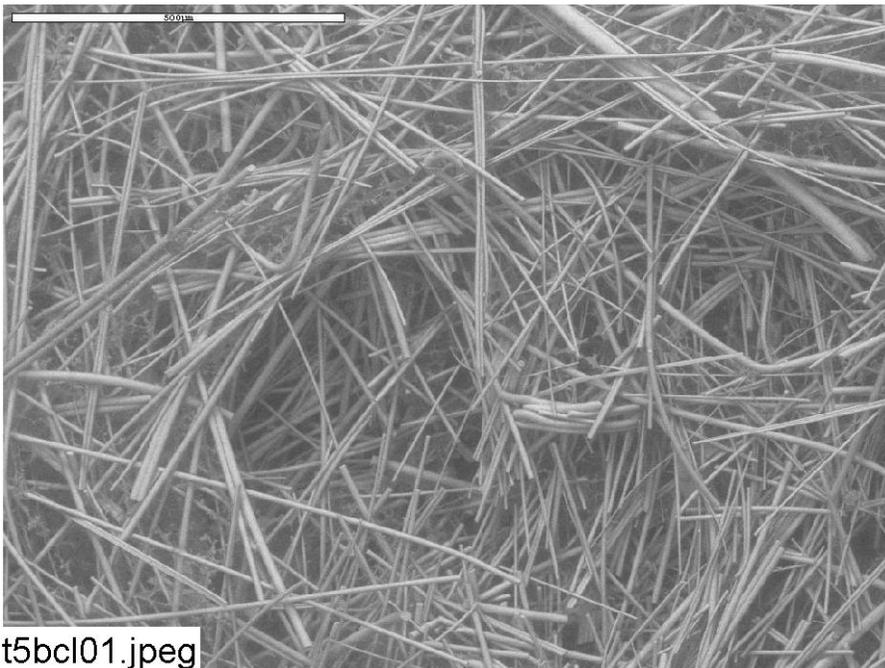


Figure C7-4. EDS counting spectrum for the deposits between fibers shown in Figure C7-3. (t5bcx04.jpeg)



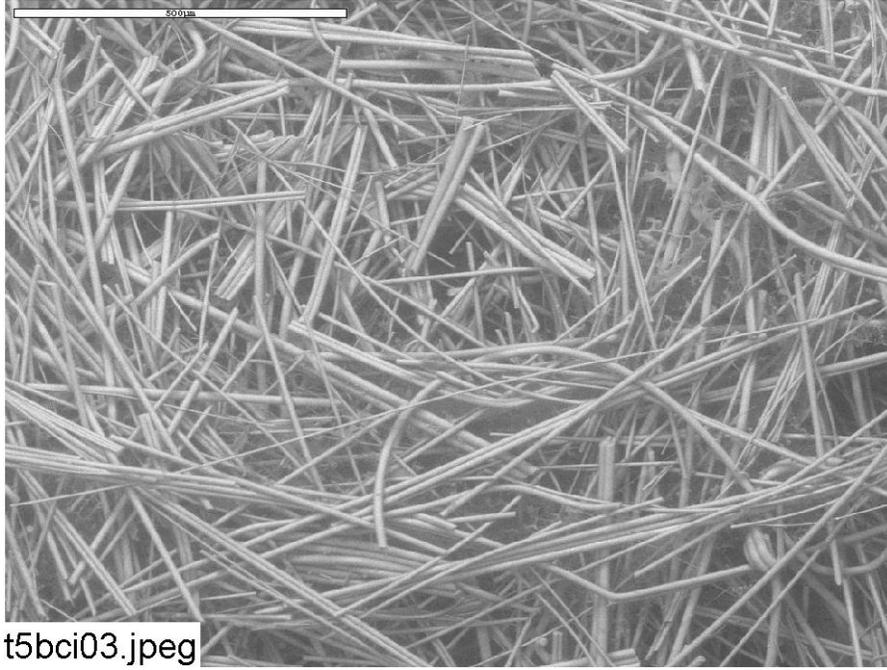
t5bcx05.jpeg

Figure C7-5. ESEM image magnified 500 times for a Test #5, Day-30 exterior fiberglass sample within the birdcage. (t5bcx05.jpeg)



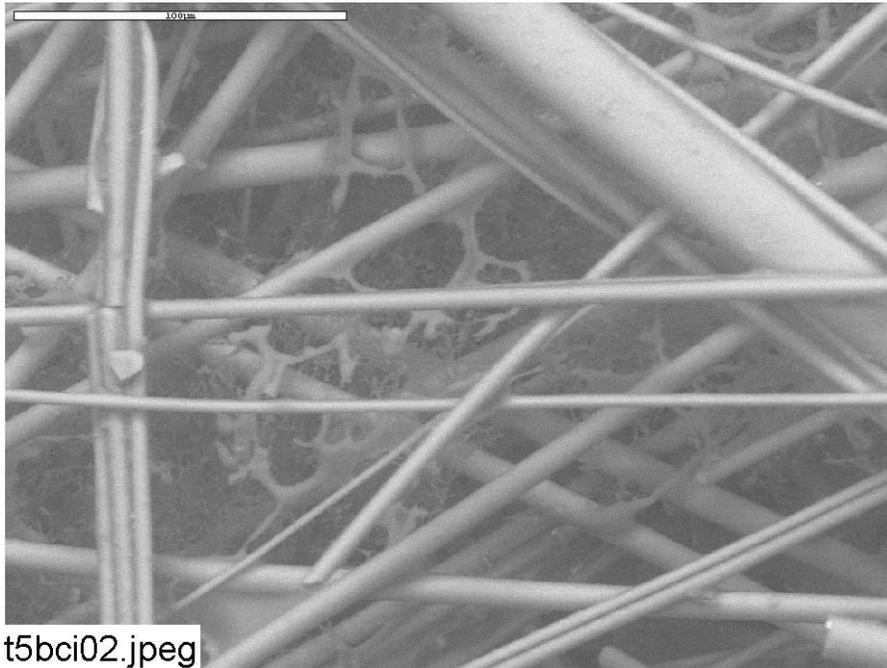
t5bcl01.jpeg

Figure C7-6. ESEM image magnified 100 times for a Test #5, Day-30 interior fiberglass sample within the birdcage. (t5bcl01.jpeg)



t5bci03.jpeg

**Figure C7-7.** ESEM image magnified 100 times for a Test #5, Day-30 interior fiberglass sample within the birdcage. (t5bci03.jpeg)



t5bci02.jpeg

**Figure C7-8.** ESEM image magnified 500 times for a Test #5, Day-30 interior fiberglass sample within the birdcage. (t5bci02.jpeg)

## Appendix D

### SEM/EDS Data for Test #5 Day-30 Deposition Products

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Deposition products were collected on the date Test #5 was shut down (August 25, 2005). The products examined were fine yellow powders that had deposited on a horizontal piece of the submerged CPVC rack.

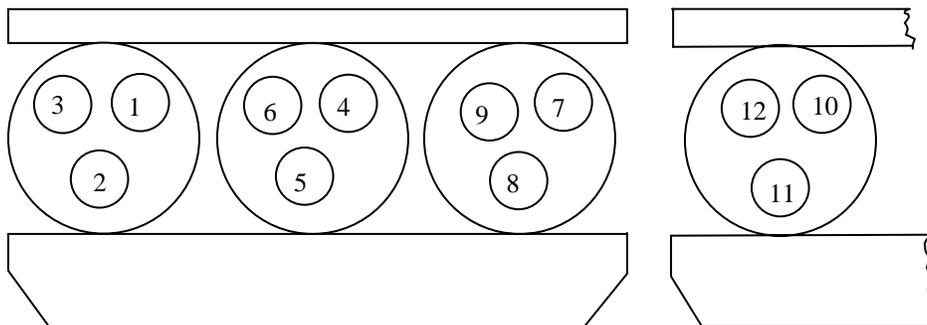
These products were collected by directly adhering onto a double-sided carbon tape for probe SEM/EDS examination. After the samples were dried in air, an Au/Pd coating was applied to enhance the surface conductivity of the samples and to prevent possible charging problems during SEM examination. Based on EDS results, a semi-quantitative elemental analysis was performed after calibration. This appendix presents the SEM/EDS data that were obtained on September 6, 2005.

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## Transcribed Laboratory Log

Laboratory session from September 6, 2005.

Test #5, Day-30 Deposition Products



Conditions: e=15.0kV, WD=11mm

1--Yellow Deposits on Submerged Rack	2--Sediment (T5D30)	3--Al-Suspended
4--Al-Submerged	5--Gal-Steel Suspended	6--Gal-Steel Submerged
7--Cu Suspended	8--Cu-Submerged	9--Steel-Suspended
10--Steel-Submerged	11--Drain Collar Interior	12--Drain Collar Outside Ext.

### Yellow Deposits on Submerged Rack

Image:	T5D30YellowDeposits001	100 ×	SEM image	Figure D-1
	T5D30YellowDeposits002	500 ×	SEM image	Figure D-2
	T5D30YellowDeposits003	1000 ×	Annotated SEM image	Figure D-3
EDS:	T5D30yllw~partcl02		EDS on particulate deposits	Figure D-4



Figure D-1. SEM image magnified 100 times for the Test #5, Day-30 fine yellow powder on the submerged rack. (T5D30YellowDeposits001.bmp)

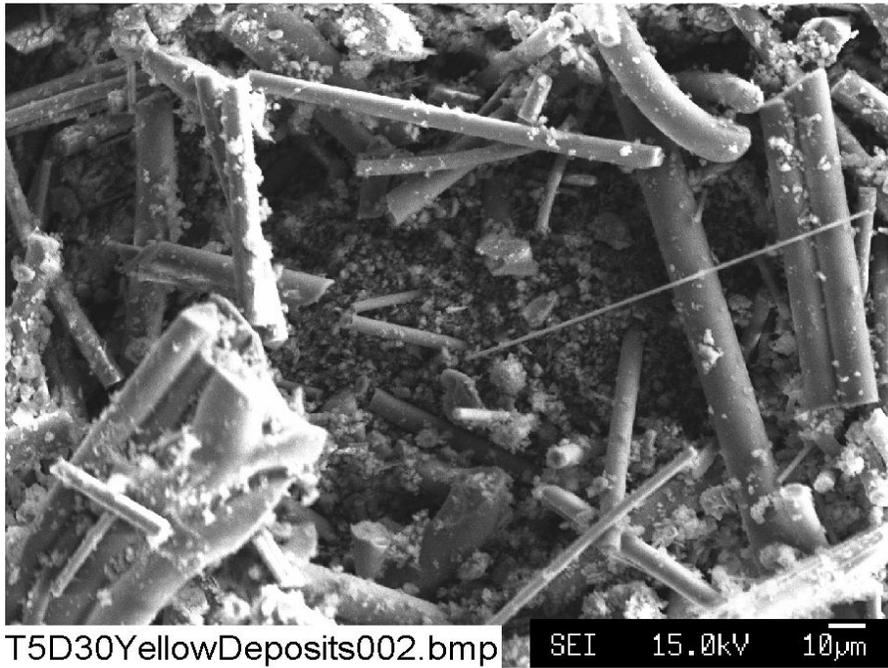


Figure D-2. SEM image magnified 200 times for the Test #5, Day-30 fine yellow powder on the submerged rack. (T5D30YellowDeposits002.bmp)

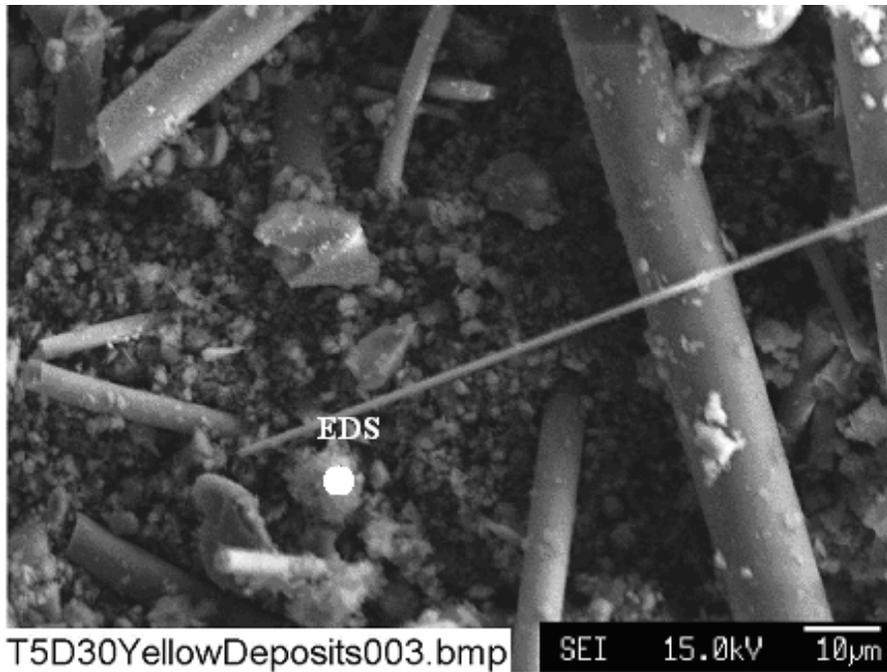


Figure D-3. Annotated SEM image magnified 1000 times for the Test #5, Day-30 fine yellow powder on the submerged rack. (T5D30YellowDeposits003.bmp)

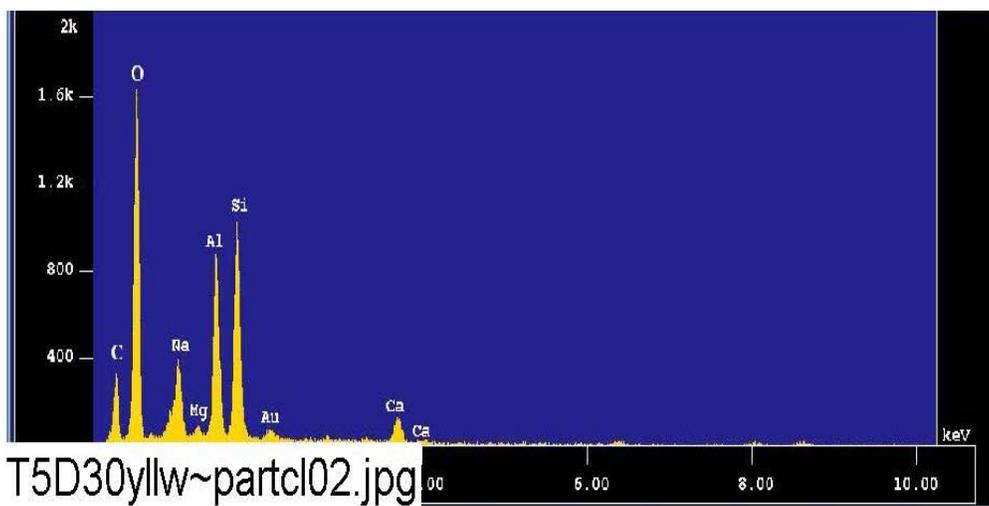


Figure D-4. EDS counting spectrum for the particulate deposit shown in Figure D-3. (T5D30yllw~partcl02.jpg)

The results from the chemical composition analysis for T5D30yllw~partcl02.jpg are given in Table D-1.

**Table D-1. Chemical Compositions for T5D30yllw~partcl02.jpg, Figure D-4**

```

Group      : NRC
Sample     : T5D30 ID# : 30
Comment    : Yellow deposits on submerged rack
Condition  : Full Scale : 20KeV(10eV/ch,2Kch)
             Live Time  : 76.130 sec   Aperture #   : 5
             Acc. Volt  : 15.0 KV      Probe Current : 1.996E-08 A
             Stage Point: X=45.414 Y=58.152 Z=11.027
             Acq. Date  : Tue Sep 6 10:38:29 2005
    
```

Element	Mode	ROI (KeV)	K-ratio(%)	+/-	Net/Background
Na K	Normal	0.83- 1.28	133.9949	0.0097	1973 / 65
Mg K	Normal	1.00- 1.53	28.4267	0.0005	356 / 338
Si K	Normal	1.50- 2.07	366.8570	0.0009	8937 / 400
Ca K	Normal	3.40- 4.30	130.0604	0.0070	1526 / 18
Al K	Normal	1.26- 1.78	325.7976	0.0016	7232 / 315
O K	Normal	0.31- 0.74	2565.1008	0.0170	48124 / 66
C K	Normal	0.11- 0.47	11427.6719	0.0238	2293 / 258

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Chi\_square = 18.5321

Element	Mass%	Atomic%	ZAF	Z	A	F
Na	1.894	1.2481	1.0715	0.9872	1.0843	1.0010
Mg	0.525	0.3269	1.3990	0.9770	1.4341	0.9985
Si	5.653	3.0482	1.1678	0.9883	1.1817	0.9999
Ca	1.657	0.6263	0.9658	1.0002	0.9655	1.0001
Al	4.586	2.5745	1.0669	0.9959	1.0732	0.9982
O	50.493	47.7996	1.4919	0.9942	1.5005	1.0000
C	35.192	44.3764	0.2334	0.9972	0.2341	1.0000

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Total 100.000 100.0000  
Normalization factor = 0.0132